



Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for soft tissue masses.

BIBLIOGRAPHIC SOURCE(S)

Berquist TH, Dalinka MK, Alazraki N, Daffner RH, DeSmet AA, el-Khoury GY, Goergen TG, Keats TE, Manaster BJ, Newberg A, Pavlov H, Haralson RH, McCabe JB, Sartoris D. Soft tissue masses. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl):255-9. [22 references]

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SCOPE

DISEASE/CONDITION(S)

Soft tissue masses

GUIDELINE CATEGORY

Diagnosis

CLINICAL SPECIALTY

Family Practice
Nuclear Medicine
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations

Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for soft tissue masses

TARGET POPULATION

Patients with soft tissue masses

INTERVENTIONS AND PRACTICES CONSIDERED

1. Routine radiograph
2. Ultrasound
3. Computed tomography
4. Nuclear medicine bone scan
5. Magnetic resonance imaging
6. Arthrography

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)
Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Soft Tissue Mass

Variant 1: First study to order.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Routine radiograph	9	Necessary. Bone and soft tissue features assist in selecting second study.
Ultrasound	1	Not first study.
Computed tomography	1	
Nuclear medicine bone scan	1	
Magnetic resonance imaging	1	Not indicated as first study, most often second study.
Arthrography	1	Invasive, only useful for communicating cyst.
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Variant 2: Radiograph negative.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Magnetic resonance imaging	9	Accepted technique to evaluate soft tissue masses.
Ultrasound	3	Probably not indicated unless cyst is suspected.

Computed tomography	1	
Nuclear medicine bone scan	1	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Variant 3: Radiograph - calcification in soft tissues.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Magnetic resonance imaging	9	May be confusing in myositis ossifications and does not define calcification patterns as well as computed tomography.
Ultrasound	1	
Nuclear medicine bone scan	1	
Computed tomography	No consensus	Useful for myositis and characterizing type of calcification.
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Clinical Condition: Soft Tissue Mass

Variant 4: Soft tissue mass - superficial or near joint with or without radiographic abnormalities.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Magnetic resonance imaging	9	Accepted technique for evaluation of soft tissue masses.
Ultrasound	4	Probably not indicated except for suspected cysts.
Computed tomography	2	Probably not useful compared to magnetic resonance imaging.

Nuclear medicine bone scan	1	Not indicated.
Arthrography	1	Not indicated, if suspect cyst. Could do magnetic resonance imaging or ultrasound.
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Variant 5: Suspected mass abdominal or chest wall.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Routine radiograph	9	Localization, calcification, etc., important for selecting additional studies.
Computed tomography	7	Useful for masses with calcification, motion artifact less than magnetic resonance imaging.
Magnetic resonance imaging	6	Useful if no calcification or bone involvement.
Ultrasound	1	
Nuclear medicine bone scan	1	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Summary

Imaging techniques for patients with suspected soft tissue masses may be requested because of soft tissue abnormality palpated by the patient or physician or because of symptoms such as pain or other complaints with no detectable mass on physical examination. The type of imaging technique initially selected varies depending on the history and physical findings as well as the suspected location of the lesion.

There has been tremendous progress in imaging evaluation of soft tissue masses over the years. Routine radiographs still play an important role in identifying certain features that may either allow the diagnosis to be established or indicate

which procedure might be most appropriate for further evaluation. Computed tomography and ultrasound greatly improve the ability to detect and in some cases characterize the nature of soft tissue masses. With the advent of magnetic resonance imaging, lesion detection differentiation of normal anatomic variants from true lesions and characterization of lesions improved because of the superior soft tissue contrast and multiple-image plane capabilities.

Routine radiography is an important first technique for evaluation of patients with suspected soft tissue abnormality, especially those that are deep and nonpalpable. Certain features on the routine radiograph may provide valuable insight into the most appropriate additional studies that may be required. For example, well-defined lucency in the soft tissues may indicate a lipoma that could be evaluated with either computed tomography or magnetic resonance imaging. Patients with subtle bone change or soft tissue calcification may be more appropriately studied with computed tomography because lesion characterization may be improved with this imaging technique. Also, lesions projecting from bone (i.e., osteochondroma) can present as deep soft tissue masses clinically.

Ultrasound is not frequently employed for evaluation of soft tissue masses at most institutions. This technique is valuable in differentiating cystic from solid lesions and has also been used to study vascular lesions. However, ultrasound is not as useful for characterizing pathology or defining the extent of lesions.

Since the introduction of magnetic resonance imaging, computed tomography has largely been replaced as the technique of choice for evaluation of soft tissue masses. However, in some cases, computed tomography may still be appropriate for evaluation of soft tissue lesions. Situations such as suspected lipoma, calcification in soft tissue lesions on routine radiographs or patients with suspected myositis ossificans based on clinical or radiographic data might be better evaluated with computed tomography. Lipomas are easily characterized on both computed tomography and magnetic resonance imaging. In addition, patient size or location of lesion may dictate that computed tomography would be the preferred technique. Such locations include the abdominal or chest wall, where motion artifact can create suboptimal imaging with magnetic resonance imaging.

Magnetic resonance imaging has become the technique of choice for detection and characterization of soft tissue masses. The improved soft tissue contrast and multiple-image plane capabilities have provided significant advantages for lesion conspicuity, characterization, and determining the extent of involvement. Vascular structures can also be more easily identified and evaluated without the need for intravenous contrast agents. Vascular structures and neurovascular involvement are more easily defined in 20% of cases compared with computed tomography. Bone involvement by soft tissue masses can be identified equally by both computed tomography and magnetic resonance imaging.

Though lesions are more easily detected with magnetic resonance imaging, the ability to differentiate benign from malignant lesions remains controversial. Numerous studies have evaluated image features of soft tissue lesions. Reports discussing correct histologic diagnosis or differentiating benign from malignant lesions describe accuracy ranges from 24%-90%. Though imperfect, the superior soft tissue contrast provided by T2-weighted magnetic resonance images provides features that are useful for characterizing lesions. Malignant lesions are

inhomogeneous (72%-94%), larger (90% >33 mm), and more frequently involve bone and neurovascular structures. Utilization of gadolinium and spectroscopy have to date not provided the degree of specificity required to appropriately characterize histology or differentiate benign from malignant lesions in all situations. Gadolinium is useful for differentiating solid from cystic lesions.

Radionuclide studies are not indicated in most situations for evaluation of soft tissue masses. There are certain exceptions, which are mentioned in the tables, above, as appropriate.

Arthrography or invasive techniques are also rarely indicated if at all for evaluation of soft tissue masses. Popliteal cysts or communicating cystic lesions can be identified by introduction of contrast material into the joints. However, this is not a well-accepted technique and is rarely performed today. With few exceptions, such as arteriovenous (AV) malformations or hemangiomas, angiography is also not frequently performed for the detection or staging of soft tissue lesions.

Anticipated Exceptions

As a general rule, magnetic resonance imaging is the technique of choice for evaluation of patients with suspected soft tissue masses. There are some exceptions where other techniques may be of equal or greater value. Computed tomography may be of greater value in patients who demonstrate subtle cortical bone involvement or soft tissue calcifications on routine radiographs. Patient size, patients with certain metallic or electrical implants, claustrophobic patients, and patients who are unable to remain motionless (pain, Parkinson's disease, etc.) for the length of a magnetic resonance examination may have to be studied with an alternate technique. Computed tomography would be selected in most situations.

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate selection of radiologic exam procedures to evaluate soft tissue masses.

POTENTIAL HARMS

None identified

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Berquist TH, Dalinka MK, Alazraki N, Daffner RH, DeSmet AA, el-Khoury GY, Goergen TG, Keats TE, Manaster BJ, Newberg A, Pavlov H, Haralson RH, McCabe

JB, Sartoris D. Soft tissue masses. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl):255-9. [22 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1995 (revised 1999)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria™.

GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Musculoskeletal Imaging.

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Names of Panel Members: Thomas H. Berquist, MD; Murray K. Dalinka, MD; Naomi Alazraki, MD; Richard H. Daffner, MD; Arthur A. DeSmet, MD; George Y. El-Khoury, MD; Thomas G. Goergen, MD; Theodore E. Keats, MD; B.J. Manaster, MD, PhD; Arthur Newberg, MD; Helene Pavlov, MD; Robert H. Haralson, III, MD; John B. McCabe, MD; David Sartoris, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline. It is a revision of a previously issued version (Appropriateness criteria for soft tissue masses. Reston [VA]: American College of Radiology (ACR); 1995. 5 p. [ACR Appropriateness Criteria™]).

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The next review date for this topic is 2004.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [American College of Radiology \(ACR\) Web site](#).

Print copies: Available from ACR, 1891 Preston White Drive, Reston, VA 20191.
Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001.

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